

CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method of producing a hydrolyzed lecithin product, comprising hydrolyzed phospholipids, monoglycerides, and diglycerides, the method comprising
 - (a) contacting a lecithin material, comprising a phospholipid component and a triglyceride component, in an aqueous or organic solvent medium, with a first enzyme, said enzyme being a phospholipase or lipase effective to hydrolyze said phospholipid; and
 - (b) subsequently contacting the product of step (a) with a second enzyme, different from said first enzyme, said second enzyme being a lipase effective to hydrolyze said triglyceride;
under reaction conditions effective to inhibit esterification of said hydrolyzed phospholipid with released fatty acids.
2. The method of claim 1, wherein said phospholipid component makes up at least 50% of said lecithin material.
3. The method of claim 2, wherein said phospholipid component makes up at least 60% of said lecithin material.
4. The method of claim 1, wherein said first enzyme phospholipase A1 and/or A2.
5. The method of claim 4, wherein said phospholipase is phospholipase A2.
6. The method of claim 1, wherein said second enzyme is effective to selectively hydrolyze said triglyceride under said reaction conditions.
7. The method of claim 1, wherein said solvent medium is an aqueous medium.

8. The method of claim 1, wherein said solvent medium comprises an organic solvent.
9. The method of claim 8, wherein said organic solvent is a hydrocarbon solvent.
10. The method of claim 9, wherein said solvent is hexane.
11. The method of claim 1, wherein said lecithin material is a retentate from a vegetable oil membrane degumming process.
12. The method of claim 1, wherein steps (a) and (b) are carried out in the presence of a membrane effective to separate said hydrolyzed phospholipids, monoglycerides, and diglycerides from released fatty acids.
13. The method of claim 8, wherein steps (a) and (b) are carried out in the presence of a membrane effective to separate said hydrolyzed phospholipids, monoglycerides, and diglycerides from released fatty acids.
14. The method of claim 1, wherein said first enzyme is phospholipase D.
15. The method of claim 14, further comprising, prior to said contacting step (b), reacting the product of step (a) with phospholipase A1 and/or A2.
16. The method of claim 1, wherein said hydrolyzed lecithin product comprises at least 56% acetone insoluble materials and has an acid value of less than 45 mg KOH/gram.
17. The method of claim 17, wherein said hydrolyzed lecithin product comprises at least 60% acetone insoluble materials.
18. A method of producing a hydrolyzed lecithin product, comprising hydrolyzed phospholipids, monoglycerides, and diglycerides, the method comprising contacting a lecithin material, comprising a phospholipid component and a triglyceride component, in an aprotic organic solvent, with first and second

enzymes, wherein said first enzyme is a phospholipase or lipase effective to hydrolyze said phospholipid, and said second enzyme, different from said first enzyme, is a lipase effective to hydrolyze said triglyceride,
under conditions effective to inhibit esterification of said hydrolyzed phospholipid with released fatty acids.

19. The method of claim 18, wherein said lecithin material is contacted with said first and second enzymes simultaneously.
20. The method of claim 18, wherein said phospholipid component makes up at least 50% of said lecithin material.
21. The method of claim 20, wherein said phospholipid component makes up at least 60% of said lecithin material.
22. The method of claim 18, wherein said first enzyme is phospholipase A1 and/or A2.
23. The method of claim 23, wherein said phospholipase is phospholipase A2.
24. The method of claim 18, wherein said second enzyme is effective to selectively hydrolyze said triglyceride under said reaction conditions.
25. The method of claim 18, wherein said lecithin material is a retentate from a vegetable oil membrane degumming process.
26. The method of claim 18, wherein said contacting is carried out in the presence of a membrane effective to separate said hydrolyzed phospholipids, monoglycerides, and diglycerides from released fatty acids.
27. The method of claim 18, wherein said hydrolyzed lecithin product comprises at least 56% acetone insoluble materials and has an acid value of less than 45 mg KOH/gram.

28. The method of claim 27, wherein said hydrolyzed lecithin product comprises at least 60% acetone insoluble materials.
29. A method of producing a hydrolyzed lecithin product, comprising phospholipids, monoglycerides, and diglycerides, the method comprising:
 contacting a lecithin material, comprising a phospholipid component and a triglyceride component, in an aqueous or organic solvent medium, and in the absence of a phospholipase, with a lipase effective to selectively hydrolyze said triglyceride under the conditions of said contacting.
30. The method of claim 29, wherein said solvent medium is an organic solvent medium.
31. The method of claim 30, wherein said lecithin material is a retentate from a vegetable oil membrane degumming process.
32. The method of claim 29, wherein said phospholipid component makes up at least 50% of said lecithin material.
33. The method of claim 32, wherein said phospholipid component makes up at least 60% of said lecithin material.
34. The method of claim 29, wherein said contacting is carried out in the presence of a membrane effective to separate said phospholipids, monoglycerides, and diglycerides from released fatty acids.
35. The method of claim 29, wherein said hydrolyzed lecithin product comprises at least 56% acetone insoluble materials and has an acid value of less than 45 mg KOH/gram.
36. The method of claim 35, wherein said hydrolyzed lecithin product comprises at least 60% acetone insoluble materials

37. A hydrolyzed lecithin product, comprising at least 56% acetone insoluble materials and having an acid value of less than 45 mg KOH/gram, wherein said product contains hydrolyzed phospholipids, monoglycerides, and diglycerides, and is produced by a process which comprises:
- (a) contacting a lecithin material comprising a phospholipid component and a triglyceride component, in an aqueous or organic solvent medium, with a first enzyme, said enzyme being a phospholipase or lipase effective to hydrolyze said phospholipid;
 - (b) subsequently contacting the product of step (a) with a second enzyme, different from said first enzyme, said second enzyme being a lipase effective to hydrolyze said triglyceride;
 - under reaction conditions effective to inhibit esterification of said hydrolyzed phospholipid with released fatty acids;
 - (c) removing or deactivating said enzymes; and
 - (d) removing said solvent medium.
38. The product of claim 37, wherein said first enzyme is a phospholipase.
39. The product of claim 37, comprising at least 60% acetone insoluble materials.
40. The product of claim 37, wherein said product consists essentially of components of the lecithin material of step (a) and hydrolyzed substances which are obtained from the lecithin material by reaction of said first and second enzymes.
41. The product of claim 37 containing at least 15% by weight mono/diglycerides.
42. A hydrolyzed lecithin product, comprising at least 56% acetone insoluble materials and having an acid value of less than 45 mg KOH/gram, wherein said product contains hydrolyzed phospholipids, monoglycerides, and diglycerides, and is produced by a process which comprises:
- contacting a lecithin material, comprising a phospholipid component and a

triglyceride component, in an aprotic organic solvent, with first and second enzymes, wherein said first enzyme is a phospholipase or lipase effective to hydrolyze said phospholipid, and said second enzyme, different from said first enzyme, is a lipase effective to hydrolyze said triglyceride, under reaction conditions effective to inhibit esterification of said hydrolyzed phospholipid with released fatty acids;

removing or deactivating said enzymes; and
removing said solvent.

43. The product of claim 42, wherein said first enzyme is a phospholipase.
44. The product of claim 42, comprising at least 60% acetone insoluble materials.
45. The product of claim 42, wherein said product consists essentially of components of said lecithin material and hydrolyzed substances which are obtained from the lecithin material by reaction of said first and second enzymes.
46. The product of claim 42, containing at least 15% by weight mono/diglycerides.
47. A hydrolyzed lecithin product, comprising at least 56% acetone insoluble materials and having an acid value of less than 45 mg KOH/gram, wherein said product contains phospholipids, monoglycerides, and diglycerides, and is produced by a process which comprises:
 - contacting a lecithin material, comprising a phospholipid component and a triglyceride component, in an aqueous or organic solvent medium, and in the absence of a phospholipase, with a lipase effective to selectively hydrolyze said triglyceride under the conditions of said contacting;
 - removing or deactivating said enzyme; and
 - removing said solvent.
48. The product of claim 47, comprising at least 60% acetone insoluble materials.

49. The product of claim 47, wherein said product consists essentially of components of said lecithin material and hydrolyzed substances which are obtained from the lecithin material by reaction of said enzyme.